Education, digital Technologies and vulnerable populations: An approximation of the Latin American and Caribbean reality

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1. Introduction and global context of the education and development theme

Education is a strategic factor in social and economic development, especially in this day and age which is characterized by the centrality of knowledge, the need to innovate and the importance of a critical and rational conscious. The so-called "knowledge economy" and "information society" have made education and learning into strategic components of any national effort to stimulate the internal development processes.

However, not all educative practices and approaches contribute equally to promote these development processes. In the current context, education is a strategic factor of development when it contributes to the development of better human capabilities, especially, those related to knowledge management, communication, collaborative work, entrepreneurship, global consciousness, compromise and citizen participation, the fair and peaceful resolution of conflict, self care and caring for others, and the creative resolution of conflict.

The Latin American and Caribbean countries face an important challenge in order to line themselves up with these goals: they must make great efforts to make their public education systems affordable, accessible, appropriate and of quality. (Torres, 2005). However, in a large number of countries, these systems are weak due to a lack of investment, weak efforts to update pedagogy, and the aggravation of the social and personal problematic of the population that it attends to. The results obtained by the few countries in the region which participated in international studies on student levels in areas such as comprehension, reading, mathematics and science (such as PISA or TIMSS) indicates that the quality of learning among our students is still very far from that of developed countries.

If this is the state of the affairs for the population in general, it is easy to deduce that the most group affected are those on situations of poverty or vulnerability, who not only face programs related to quality but also more basic difficulties such as access and high drop out rates.

Another one of the conditions that is considered necessary in order for educational plans to function as true levers of development is their explicit link to the strategic lines of the national development plan. (Kozma, 2005). Educational policies must connect themselves with social and economic policies, in the framework of a global strategy that revolves around a series of strategic pillars which make it possible to improve the levels of human development in the country. Along the same line and following the argument of Torres (2005), we consider that we must move on from "alleviating poverty" to motivating actions if we are going to achieve educational and social change in the region that will lead societies to greater well-being and justice. It is obvious that compensatory policies are necessary but they do not resolve the problem at its root, and therefore it is necessary to move from education as a self-contained sectoral policy to education as a trans-sector policy linked to central aspects such as productivity.

The challenge lies in thinking of education not only as being necessary but rather thinking about what type of education is needed to achieve well-being and development. This is the crucial aspect since it has been proven[1] that a factor that contributes considerably to inequality - characteristic of the poverty patterns in Latin America - is the low average education level of the population, which generates a social divide sustained by insufficient human capital. In this case we can say, without fear of being misleading, that in the Latin American and Caribbean region the economic divide as much as the social divide is explained to a large extent by a deep "educational divide".

The equity problem without a doubt is one of the most serious development problems for the region, and that is why those countries with the least inequality, as much in terms of educational opportunity as in terms of access to capital goods, have achieved greater economic growth. This means that an adequate policy of economic resource distribution, and particularly the distribution of quality education opportunities or resources, has had a much greater impact in the countries that have been able to shape this type of development.

Faced with this important challenge, the incorporation of digital technologies into education could play a powerful catalyzing role. In the first place because digital technologies present an opportunity to transform the basic concepts of education, in a way that coincides with the requirements of the new knowledge society, and can represent essential elements of renovation in education systems in a way that allows for the advancement towards this new social, economic and cultural model. And secondly, because it is increasingly expected that digital technologies will play a determining role in the economic development strategy of the countries in the region.

2. Brief global description of the use of applied digital technologies in education

The use of digital technologies to approach questions of education, learning and capacity development is one of the great challenges currently facing governments, communities and agencies. Even though all are convinced of the contribution these technologies can have towards the reduction of poverty and towards educational efforts, there does not seem to be a vision, path or universally accepted method that guarantees that they will bring along the desired changes. It is fundamental therefore to achieve the understanding of this technology, as well as to visualize and plan the forms in which its benefits can be maximized in the framework of the efforts in favour of human development.

What does seem reasonable is to think that digital technologies convert themselves into a powerful source of development when they are used as instruments to unleash human capacities and creativity, while they generate technological skills and creativity and increase productive potential. A brief overview of the principal

[1] See Londoño (2000).

trends in the use of digital technologies applied to education in the last two decades follows[2]:

- ***Computer-assisted instruction***. This was one of the first uses of computers in education. Its use is aligned with the instructional paradigm and the focuses of programmed teaching consisting of the presentation of curriculum content, followed by exercises which usually finish in performance tests. Governments saw these proposals as a way of reducing teacher hiring, training and monitoring costs but they soon proved to be inadequate. Nonetheless, they still exist under the cover of new innovative and attractive multimedia versions.

- **Computer literacy.** This type of program has generally been directed towards the development of technological skills for operating the machine in order to carry out work tasks. Usually called "computing classes" and mostly offered by secondary education centres and telecentres, their objective is to teach students how to use the "machine" and commercial computing applications (word processors, spreadsheets, databases, etc.)

- **Content dissemination and multi-media resources for self directed instruction**. These are software programs intended for self-directed instruction and electronic content materials (accounting tools for the home and office; language or art or music instruction programs; sports entertainment; etc.). Many of these programs are distributed on compact disc through multiple channels: newspapers, magazines, with printed books, in supermarkets, stores and most recently online. These programs have contributed to familiarizing individuals and organizations with new digital technologies, programs and resources. Frequently parents have pressured educational institutions to provide this type of tool, which has led in some cases to well-intentioned but improvised and superficial technology implementation processes.

- **Technology-enriched learning environments.** As of the 1980s, new ideas for the introduction of technology in education began to spread. These approaches emphasized the method of learning by projects, exploration and construction, play and the resolution of problems as new points of entry for cognitive development with the support of technological resources. Some of these projects were based on programming languages such as Logo and MicroMundos. The essential characteristic of these programs, both those based on programming and on other tools, is that pedagogical objectives were at their centre, instead of the technology itself. The digital technologies that supported these projects were carefully chosen in function of their potential to supply the desired learning results.

- **Projects based on the use of the Internet**. The explosion of the Internet in the middle of the 1990s brought with it networking as a new dimension for computer use: interconnectivity, interconnected databases and the convergence of different media. The opportunities offered by this technology were reduced to

[2] For a more detailed analysis of these categories, see Fonseca (2005).

the vision of the Internet as an information and communication technology, that is to say, as a medium to distribute and obtain educational information and content. This vision reinforced the old instructive paradigm for education, where the focus of attention was placed on downloading and uploading information to the network, and to create content bases and websites for teachers and students. This use made the real potential of the Internet as a learning environment invisible and emphasized the fallacy that having access to information means development and knowledge. Today we know that the challenge is to produce understanding and learning from information and to develop high level intellection and cultural competencies, which is a challenge for everyone but even more so for impoverished communities.

- **Virtual and online learning resources and initiatives.** These activities have become very popular technological applications, particularly in the superior education sector and in continued professional training in companies, industries and educational institutions. Some of these programs are notably innovative, although others are only digital adaptations of traditional long distance education programs. One of the greatest difficulties that this type of program has faced is that they have started from the supposition that they permit massive but personalized distribution of low cost courses, when in reality there is a lot more to research with regards to online mediation, “visual literacy” and interaction and design mediated over the Internet. The online learning environments must be understood as something more than the platforms for the distribution of content and information, and for exchange and interaction; they should be visualized as virtual spaces in which new learning experiences can be created through new resources.

- **Educational projects and programs produced by corporations.** The slow pace of adoption and the reductionism of many of the implemented programs have led large software and hardware companies to create their own educational programs for all levels of education. Often they are created as corporate social responsibility initiatives, and they are implemented through partnership agreements with governments, academic institutions or social organizations at a local level. These programs are not usually centred on the technology itself but rather on its more global link with the curriculum, and have had a notably wide reach in terms of the number of students and teachers who have benefited from the programs.

3. Use of digital technology in education: realities and problems with poor and vulnerable populations in Latin America and the Caribbean

3.1 General Framework

In Latin America and the Caribbean, policies to facilitate access for poor and vulnerable populations to digital technologies have principally chosen the "shared access"[3] model, with the establishment of two strategies being observed:

1) Universalization of access to computer technology processes and access to the Internet in the public education system and telecentres through the work of the State with public investment or through the intervention and financing of multinational corporations and organizations.

2) Focalization of programs on specific populations in situations of social exclusion.

Despite the fact that the decisions for and implications of choosing each strategy are different, the purpose pursued by the implementation of both strategies appear to have a common justification. With greater frequency this justification is based on the role that decision makers assign to education and to access to and use of technology, as indispensable aspects for the generation of conditions that stimulate the creation and innovation of knowledge in societies whose social capital needs to be increased. This recognition is accompanied by a vision about how to drive economic development and the productivity towards the achievement of better social conditions for all of the population but most of all for the most impoverished and vulnerable groups.

Despite the fact that investment in education in Latin American and Caribbean countries is low, many have made important investments for the incorporation of technologies in the educational system, with support from refundable or non-refundable loans. These investments have not always consolidated into true social and education development strategies given that they are the result of a vision aimed at modernization and not the qualitative transformation of education systems.

Nowadays policies that focus on educational transformation are needed considering that the challenge lies in the development of learning skills that prepare people for the demands of this century[4] such as fluency to face the digital era, creative learning, development of invention and imagination, collaboration and effective communication, and high productivity.

The role that education and technologies can play to stimulate the development of capacities and to open opportunities for poor and vulnerable populations is

[3] Denomination used to refer to an implementation model in which computational and telecommunication infrastructure in installed in a public or private space where it can be accessed and shared by different groups of people.
[4] Expanded upon in North Central Regional Educational Lab.

undeniable. However, it is essential to consider that in general these are societies characterized by deep inequalities and asymmetric relationships in which a minority accumulates the majority of the social and cultural wealth created. For this reason, political approaches consider the necessity to advance towards the construction of conditions and resources which are essential in order to truly benefit from equality of rights, and access to good and services, and even more so from the development of human potential.[5].

An important delimitation to consider in this section is the multidimensional[6] character required for the analysis, approach and measure of poverty[7] and vulnerability[8]. This is a determining consideration in the definition of more integrated policies, as much for the improvement in the quality of the education system as for the improvement in digital technology in a context that goes beyond the magical vision that the introduction of technologies improves education by itself. In these cases it is essential to place special attention on the expected impacts and how to generate the conditions to achieve them.

It is worth pointing out that the topic of impacts entails two problems. On one hand, there is no evidence that there is systematic thinking based on the indicators of the social impact of the initiatives or the levels of social appropriation generated by the incorporation of the technologies in education. On the other hand, some of the available methodologies do not go beyond the traditional approaches that limit the evaluation of impacts which capture the reach of the most fair and equitable opportunities for people.

3.2. Realities and problems of the approaches

What follows is a review of some of the trends and problems that have resulted from the approaches taken to define policies and implement some of the access to digital technology in education social inclusion projects in the Latin American context:

a. Unclear and unaligned strategies

- **Isolated national plans that do not feed off of the experience of other countries.** This strategy obstructs and wastes the possibility for the exchange of accumulated experiences and knowledge in the different countries which could facilitate decision-making and the better use of investment.

[5] See Sen, A. (1999).
[6] They are multidimensional in the way that they affect individuals, groups, and communities in the different levels of their wellbeing, in different ways and with different intensities.
[7] Poverty can be understood as the state of want that impedes people from satisfying their basic needs, from developing an adequate standard of life, and from counting on the adequate resources for their development, as individuals and as part of a collective.
[8] The idea of vulnerability is understood as a multidimensional process that converges in the risk or the probability that the individual, home or community will be hurt, injured or harmed by changes or permanency in external and/or internal conditions.(Busso: 2001).

- **Coordination problems between the national and local or municipal levels,** which easily results in the superimposing of parallel programs and investment and the disintegration and poor use of participating social actors, as much in decision-making processes as in the execution processes and those that are benefited by the different initiatives.

- **Multinational corporations in charge of the definition of educational policies.** Even without deciding to, some multinational corporations[9] are taking a protagonist's role in the definition of educational policies and models. This phenomenon is observed with more frequency in countries trying to correct the existing vacancy.

  There is no doubt that corporations could make better contributions in the framework of strategic multi-sectoral alliances QUE IMPLIQUEN a concerted definition of the policy lines for the different actors to follow..

b. Technological infrastructure and connectivity as solutions to poverty

Despite that technology insertion projects to tackle the conditions of poverty and vulnerability in Latin America and the Caribbean appear to coincide in the vision that recognizes that the insertion of digital technology in the education sector could represent a strategic element in the national and regional development plans, various problems[10] have been identified with the way in which projects and initiatives with this purpose are being introduced.

- **Access is the result of having the infrastructure.** There is an emphasis on investment in computing equipment and the supply of connectivity to the Internet, based on visions that maintain that "access" is the result of having the physical and logical infrastructure. This is a risky position to support since it has already been studied that many of the so-called "new technologies" have been set up or tended to quickly convert themselves into "infrastructural technologies". [11] This practically reorients the emphasis towards the need to think and propose effective and innovative ways to use digital technologies to secure greater productivity linked to the integral development of people and improvement of the conditions and quality of life the individuals and society.

- **Initiatives and projects focused on a misinterpreted preconception of human capital**[12], more prone to the training of "cheap labour" than to the proposal of quality educational opportunities focused on the development of

[9] Programs such as Intel Ecuador for the Future (Intel ®) and the Microsoft Alliance for Education can be analyzed as examples since they are widely diffused and welcomed programs in Latin America and the Caribbean.

[10] A critical aspect in the analysis of the insertion and the impact of digital technologies on development is their diversity and dynamism. The difficulty lies in defining which technologies are being referred to with concepts such as *information and communication technology* and even *digital technologies.*

[11] See Carr (2003).

[12] See Fonseca (n.d.). The great challenge of education in the time of globalization.

the human potential that goes beyond the point of view of "capital" as it is understood as a labour force for a particular industry.

- **Emphasis on the "digital divide".** There is a marked emphasis on access to Internet and its relation with the so-called "digital divide" [13] instead of concern about overcoming the "social divide" and achieving a true appropriation of the technologies. This problematic is based on the consideration and the redirection of interest to the fact that the Internet is creating a world divided between those that do and those who do not have access. It is recognized that lack of connectivity can certainly increase the weaknesses associated with the labour market and that unconnected associations are more vulnerable to the loss of economic competitiveness at the international level, but it is important to draw attention to the need to also focus attention on the possible "social divide" which is much more important than technical connectivity and which is related to educational and cultural capacity to use the Internet since once the codified information and knowledge is online[14] another type of knowledge is needed (know where the information is, how to look for it, how to process it and how to transform it into specific information for what the user wants to do). This capacity to learn to learn and to know what to do with what one learns, is a socially unequal capacity that is linked as much to social and family origin as to a person's educational and cultural level. This is where the digital divide really lies at this time.

- **Short term vision** that accompanies many projects and initiatives. An essential factor to consider in order to achieve a long-term and more cost-effective perspective is investment in projects that involve the creation of opportunities for children, and which can translate into true socioeconomic and cultural transformations.

c. Limited character of policy

- **Clear separation between economic and social policy.** The approach to poverty thinks in sectoral terms instead of assuming it as a multi-sector natured problem.

  Policies to overcome poverty are not always linked with employment generation and productivity-stimulating policies, or usually oriented towards community empowerment, but rather work on CONYUNTURAL problematics. In this way, employment policies are articulated with policies which promote SMEs, but not with community development or food programmes.

- **Aid policies**. In many projects in the region, as much in those promoted by governments as those promoted by civil society organization, it is seen that few have fixed concrete and feasible goals to eradicate extreme poverty and

[13] See Castells (1999). Opening lesson given in the Knowledge and Information Society Doctoral Program at the Open University of Cataluña.
[14] See Castells (1999).

reduce poverty in general.[15] In large part the projects are not integrated into national integral policy. Community development policy is characterized by aid and employment policies are characterized by not providing training in the tools of the new economy.

- **Emphasis on economic recovery rather than the reduction of poverty.** Currently in Latin America and the Caribbean, there is a trend to define national plans[16] for the introduction and diffusion of digital technologies, both in formal and open education scenarios, which emphasize the possibilities for economic recovery in the medium and long term, but not so much in the use of this technology to reduce poverty, increase gender equity or contribute to sustainable development.

[15] Expanded in the research of Finquelievich (2003).
[16] See Finquelievich (2003).

4. Analysis of specific cases, sub-regional particularities, ways of approaching the problematic, actors involved, initiatives to maintain and innovations to undertake

The Latin American and Caribbean regions has been characterized by a varied collection of models for the introduction of digital technologies intended to reduce poverty. In this section, three models which have stood out in the past years are presented:

a) National and multi-sectoral strategies for the introduction of technology
b) National programs to promote the use of digital technology in public education centres and in community telecentres
c) Local projects focused on vulnerable and poor populations

a) National multi-sectoral strategies for the introduction of technologies

Countries in the region have driven national multi-sectoral strategies that try to motivate diverse elements of strategic development in technology in a coordinated way. These strategies which are called "national strategies for the information society" in some CEPAL documents (CEPAL, 2003; Villatoro y Silva, 2005), are initiatives which are mostly led by government telecommunications offices, and which articulate the efforts of different actors and institution sectors, both public and private, with the aim of overcoming the digital divide and promoting development with the support of digital technologies. Even though they include the participation of different ministerial departments (and in some cases business, social and academic organizations), the education and economic sectors have a lesser presence.

There is little systemized information on this type of initiative, and what is available is very general and of a descriptive nature. In some cases, these policies have been framed within the so-called "digital agenda", or strategies for the incorporation of digital technology into the educational and productive processes of the countries. Perhaps because they are recently formulated policies, no analysis or references on their reach or results have been found.

According to the Villatoro and Silva study (2005), which was based on a CEPAL report from 2003, the majority of these initiatives are in the design or redesign phase, or just carrying out their first introduction efforts. They are fundamentally directed towards improving infrastructure and in some cases to achieving universal access to digital technologies; to creating and strengthening governmental electronic services; and promoting productive development and especially e-commerce. In some cases the strategies also include human resources training and productive development as a priority theme. A small group of countries also specifies the intention to invest in digital technology research and development.

Due to the rapid evolution of the policies in this sector, the data could have changed. However the data presented by Villatoro and Silva (2005) offers various findings. First, that except in a few cases, the plans establish a weak explicit link with poverty reduction purposes.

Secondly, it is observed that these national strategies do not usually incorporate programs that the majority of the countries have implemented to permit shared access to digital technologies in educational centres and telecentres. The national school projects are generally older (the first one started at the end of the 1980s; the majority during the 1990s and the first few years of the new millennium). The national programs for the creation of telecentres appeared later, but although they usually coincide with the launch of national multi-sectoral strategies, it is not always clear how the two are linked.

Thirdly, it worth studying whether these strategies are supporting true opportunities for the development of capacities: that is to say, if the presented resources connect in a significant and pertinent manner with the needs and characteristics of the benefited population in a way that really contributes to the generation of capacities. Using the observation levels to determine contributions to equity (FOD, 2005), it is possible to state that the strategies try to overcome the conditions which are adverse to equity, in the sense that all try to overcome the lack of access to physical infrastructure and telecommunications, and some even try to create training actions and investment in research and development. However there is room to ask if they are designed with a global and strategic vision of the challenges and opportunities that are facing the country and if they are based on a clear understanding of the vital importance that the generation of capacities has for the use and promotion of technological processes.

b) National projects to promote the use of digital technology in public education centres and in community telecentres

As mentioned in the section above it is easy to identify two strategies used to facilitate the access of poor and vulnerable populations in Latin America and the Caribbean to digital technologies, nevertheless these two strategies represent a broad diversity of purposes, introduction models, approaches and populations to which they are directed. The relevant details are described below:

b.1. Massive installation of computing equipment and access to the Internet in the public education system

Since the second half of the 1980s, countries in the area report initiatives for the massive installation of computing equipment in the education system. The phenomena of Internet access is more recent and started with pioneer developments in the 1990s.

It is important to emphasize that the meaning of poverty and vulnerability that surrounds this strategy is based on the macro-social idea of considering the country as poor and vulnerable, which results in the dedication of public investment to the

creation of technology introduction programs and projects in the education sector which permits the creation of human capital to be linked to the purpose of generating better conditions for productivity. The decisions and ways of introduction vary between countries, which is why some relevant aspects and illustrative cases are briefly outlined below:

- Universal access to technology as a factor of modernity and of socioeconomic development tends to be an aspect found in the justification of these experiences. Universalization is usually linked to the definition of policies at the level of a broad social development program, or else linked to the definition of processes to the education improvement and innovation associated with actions of the ministries of public education. The national programs of Computing Education of Costa Rica[17] and Chile[18] are examples which have held up over time.

- Diverse introduction models exist, some of which have centred on ministerial actions, or else have been introduced as combined models with the intervention of non-governmental organizations or universities that support the central government's management. Nowadays, these combined models tend to be increasingly more frequent, proven by the effectiveness of the programs in Costa Rica (supported by the Omar Dengo Foundation), Mexico (in the case of School Network – Red Escolar – supported by the Latin American Institute of Communications Education ILCE) and Honduras (driven originally by the Ministry of Education and currently supported by the FEREMA Foundation). Currently, the model is being pursued by countries such as Panama (with the participation of the Gabriel Louis Galindo Foundation) and the Dominican Republic (supported by FUNGLODE), among others.

  The diffusion of this model is due in a large part to the possibilities that it offers for providing sustainability and monitoring of the investment that the implementation of these computing education projects implies. This model is particularly important because as it is well known, historically many projects to introduce technology into education have disappeared or suffered important changes in their execution due to problems resulting from a change in government since in Latin America this often results in changes in the leadership of projects as well as in the substitution or separation of civil servants from critical responsibilities. The shared execution model, which involves the participation of different actors has allowed for the creation of the conditions needed for more stability and the sustainability of the initiatives.

- Some initiatives were ahead of today's trend and focused their approach on the development of capacities. This is the case of the National Program for Computing Education in Costa Rica (Programa Nacional de Informática

[17] Nacional Computing Education Program MEP-FOD.
[18] Links Network in Chile.

Educativa), Links in Chile, PROINFO in Brazil and Connections in Colombia.[19] These initiatives have bet on the definition of policies and economic investment as factors of sustained development in the long-term. Other initiatives have focused on the preparation of specific skills for the labour market, trying to link educational experiences for the generation of human resources with easy insertion in some productive sectors, resulting in a short-term solution that does not always result in real development opportunities for people and society.

- Another important aspect is the population which benefits from these initiatives. Two historic trends can be pointed out. One is incorporation at the secondary education level with the vision of providing computer literacy for the work world. The other is to initiate sustained work with younger generations of girls and boys with priority given to rural and socio-economically vulnerable zones.

b.2. Installation of community telecentres in areas with characteristics of social exclusion

Telecentres can be defined as centres of public access to the Internet. In the case of national policies to create community telecentres, it is possible to say that the telecentres combine universalization of access with targeting of certain sectors of the population. One of the recurrent elements of the discourse is the "right to information". Unlike internet cafes, telecentres are facilitators and community promoters, not merely suppliers of technological services. They normally service sectors of the population that find themselves in situations of poverty and try to channel projects for social and personal change. (Chasquinet, 2002).

In Latin America and the Caribbean, most of the telecentres are of a community nature, and driven by central or local governments (70%). In some cases these telecentres are run by to NGOs and businesses. Twenty-eight percent (28%) are installed in schools, and 2% are driven by NGOs and private initiatives (Chasquinet, 2002).

c) Local projects focused on vulnerable and poor populations

Unlike previous projects that had a spirit of universalization within the possibilities presented by the available resources, this category includes those initiatives managed by NGOs, local governments and international cooperation agencies, with the purpose of helping certain populations. Another difference is that in addition to the projects located in schools and community telecentres, in this category you see different introduction methods such as mobile buses, projects located in libraries, or in the NGOs or academic institutions themselves.

There are at least two types of tendencies that approach the use of digital technologies for the reduction of poverty, which are presented below. These approaches, understood as a possible contribution to the reduction in the levels of

[19] This is an example worth rescuing. Even though it is a national initiative, it has an important reach in the Department of Medellín, and it has recently appeared on the Secretary of Public Education´s list of national policies.

social and economic exclusion and vulnerability of impoverished populations, respond to a particular focus of the use and potentialities of digital technologies. With this said, it is necessary to inform that it is difficult to obtain a complete and precise panorama of the approaches used for specific projects due to the great diversity in the region, the scarce systemized documentation of the projects, and finally due to the fact that project materials tend to employ a rhetoric that does not necessarily correspond to real practice. Therefore what is presented below is an approximation on the base of examples selected from the information that it has been possible to find during the elaboration of this document.

1) Projects that offer access to technology and to technology literacy. These initiatives aspire to develop skills for the use of computer programs, principally to support specific tasks related to work and preparation for insertion into the labour force. The justifications for these projects usually include references to the right of people and communities to information, as a key element to overcoming conditions of poverty and marginality. Many community telecentre initiatives ascribe to this focus. These are projects that offer the community the possibility to access technological resources (especially the Internet), and learn to use them for uses such as schoolwork, the exchange of e-mail with family and friends, for carrying out internet searches, chatting online, accessing educational games, scanning images, printing documents, etc.)

2) Projects that advance opportunities for the meaningful appropriation of digital technologies and the development of capacities, understood as possible new operations for processing information, creating knowledge and communicating, that become part of the repertoire of alternatives of actions towards people faced with specific situations (FOD, 2005). The projects with this focus are based on the conviction that the stimulation of development processes requires learning a meaningful and creative use of digital technologies. These are initiatives that in general seek to connect the uses of technology with development processes within communities, taking advantage of the potential of the technological resources to drive personal and human development, economic productivity, and the creation of social networks, literacy and political actions.

Some of these projects are aimed at helping youths in slum areas and marginal urban zones as well as street kids. In these cases, digital technology is used as a stimulator of integral human development, reinforcing elements such as self-esteem, the construction of personal and cultural identity, and the discovery of talents and passions. The Street Kids project run by the Chasquinet Foundation in Ecuador for example, puts a pedagogic focus that consists in learning, doing and playing into practice where digital technologies support this process in a natural way. For example, girls and boys from 9 to 16 years old use photography and image editing on the computer to explore the images they have of themselves, or e-mail to put themselves in contact with people who have occupations that they would like to have in the future. They also carry out professional competitions to put in place and manage micro-enterprises.

Other projects have specialized in assisting one of the sectors of the population that suffers most from social and economic exclusion in the region: indigenous groups. The Quiché Link Project in Guatemala (El Proyecto Enlace Quiché) for example shows a tendency towards the integral use of technology in daily life. In the educational environment, one of its objectives is to strengthen the training of new teachers to support intercultural and bilingual education, widen the presence of Mayan cultural and language content in the official learning plan, and promote participative and interdisciplinary methodologies in education, all with the help of new digital technologies.

Finally, other projects fall into the dimension of digital technologies as tools capable of promoting productive and commercial development. These are projects that incorporate digital technologies as one more element of an integral plan for the development of productivity capacities. One example are the workshops for female micro-entrepreneurs organized by the Omar Dengo Foundation with the support of the Inter-America Development Bank, in which the participants learn to manage the tools of technological productivity in the framework of a strategy that strengthens their managerial and commercial capacities, as well as their self esteem and personal efficiency. From the perspective of community intervention, another example is the Alternative Rural Centre in Limón de Ocóa (Centro Rural Alternativo de Limón de Ocóa) in the Dominican Republic. This telecentre has acted as an important social and economic stimulator. The community does not have electricity but thanks to a group of organized youth, they were able to install an electricity generation plant making use of a waterfall. Additionally, the telecentre has permitted the community to establish direct contact with cooperation agencies in order to drive development projects without requiring the intermediation of a NGO.

5. Conclusions and recommendations of possible central lines of investigation

5.1 **Conclusions, learning and contributions to the discussion**:

The teachings derived from the institutional experience of many organizations, as well as the historic analysis of approaches tested to date for the incorporation of digital technologies in education to overcome poverty, allow the following conclusions to be drawn.

- **It is essential to avoid the rear-view mirror syndrome**[20]**.** There is a tendency to introduce technological innovations while trying to make them adjust to previous routines and traditions, which causes conventional practices to be maintained and strengthened despite the innovative potential of many technologies and wastes the true mobilizing possibilities of learning and educational environments.

- **It is necessary to reverse to the belief that information automatically produces knowledge.** This is a questionable concept that is usually observed in the approaches of numerous initiations where the terms "information" and "knowledge" are used interchangeably. This belief is based on a deep fallacy. It is a simplistic concept that risks not focusing on the truly important questions in working for the development of complex thought associated with the capacities for analysis, understanding, and construction of meaning. In the case of poor and vulnerable communities, this is a particularly sensitive point since we are talking about the capacities of reading and writing and the consequent possibility to carry out critical analysis, inferences and express points of view both orally and in writing. Access to information does not guarantee the understanding to transform it into knowledge. Consequently, it is necessary to undertake careful people-centred training.

- **The key is in added value, not in the installation of digital technologies:** The competitive and productive value of digital technologies lies with what people do and make with them. Countries should not wait until the entire infrastructure and access is made universal before thinking about the development of intellectual and creative competencies that are required to be productive with new technology.

- **We must move beyond routine skills to a higher level of thinking competency.** What the new social, economic and cultural circumstances require is the development of symbolical and analytical capacity, what Reich (1992) has called "symbolic analysts": people capable of carrying out complex thought processes which allow them to infer, deduct, conceptualize, imagine, create and innovate. Therefore it is fundamental to launch programs and

[20] This term was originally coined by McLuham and was lated redefined to refer to the digital by Paul Levinson (2001).

initiatives that lead to the development of these talents. Efforts cannot continue to be centred on mere computer literacy, but rather need to focus on a comprehensive appropriation oriented towards innovation and creation. Experiences must be focused towards development of the human potential of people and communities, a potential that empowers them and permits them to accompany a productivity linked to the improvement of quality of life and citizen participation.

- **The most successful initiatives are those that have known how to carefully link the pedagogical, technological, administrative and financial aspects of the project.** It is necessary to think carefully about the link between the technological, pedagogical, administrative and financial aspects to guarantee the success of initiatives, particularly in the case of national educational projects. Also, it is important to manage the creation of links between different organizations and between different sectors (public, non-profit, and business) with the aim of increasing the bases of support of the initiative and making it sustainable over time.

- **Training and monitoring are central to guaranteeing success.** The training and monitoring and support of educators and personnel responsible for the execution of the projects are essential to achieving success. It is not adequate to only provide introductory training, particularly in the first stages. It is essential to count on a backing preferably throughout extended periods of development. It is also fundamental to make the necessary financial provisions so that these services can be provided.

- **The need for innovative leadership and the creation of agents of educational change.** Today's true challenge is the transformation of educational practices and opportunities. For this reason it is necessary to identify and stimulate the emergence of leaders that have the force and the energy to carry out the required processes of educational change.

- **Investment in childhood and youth, particularly in rural and marginalized zones.** The putting in place of programs oriented to the development of intellectual and technological skills among children and youth is a strategic investment when available resources are limited. Children and youth do not only have an extraordinary capacity to appropriate the technology in a significant way, but they can also act as disseminators and agents of change. It is particularly important to undertake these investments in rural and marginalized areas.

- **It is necessary to start to think about recognition systems and competency accreditation.** In a context where education spaces have diversified and widened to cover growing educational needs, and where therefore non-formal educational initiatives have multiplied, it is necessary to think about systems that permit official recognition and accreditation of the competencies acquired outside of the regulated educational establishments.

- **Trans-sectorally articulated initiatives and projects that transcend the purpose of aid.** The multidimensional character of poverty obliges the projects and initiatives that seek to contribute to its disappearance suggest an articulated type of work articulated between different social sectors of the countries, since it is only in this way that the machinery be created to tackle integral and more appropriate solutions. Another aspect will consist of the strengthening of the connections between countries: it could be valuable to count on regional alliances that permit the exchange of experiences and lessons learned, the joint definition of big policy lines, and mutual support in areas of common interest.

- **Governments play a central role.** Governments have a determining role to play in the leadership of the definition of priorities and in the thrust of policy and programs that make national goals possible. As it has been seen, poverty reduction is directly linked to the formulation of strategic development plans and the execution of public policies that permit countries in the region to reach acceptable levels of personal, social and economic wellbeing, and therefore it is essential that the State intervenes to facilitate the establishment of the grounds and the environment that will make it possible for different social and economic sectors to interact in a coordinated way towards the common development goals.

- **The phenomenon of educational portals requires more analysis.** There is the risk that in the creation of portals there are overtones of "pedagogical renewal". There is real enthusiasm for portals despite fact that frequently they are not critically analyzed and are not based on the identification of research achievements and results. It will be necessary to adjust the expectations about this type of resource and its real potentialities and to secure the maximum use of these in terms of the management of information, interaction and clear understanding of its potentialities and limitations.

5.2 **Recommendations of possible lines of research**:

Next some of the recommended lines of research will be indicated. These spring from the previous considerations and from the wealth of information that has been detected until now in the present paper.

a) <u>Education, technology and the development of human capacities</u>

- **Research on cognition and motivation in the context of poor and vulnerable populations.** There are already theoretic and methodological developments relative to what has been conceived as "capacity poverty" (UNDP, 1996) and we think that it deserves to be a central theme in the research efforts of organizations dedicated to human development and overcoming poverty. Some of the research questions that could be approached include the following:
    - What are the principal deficits that these populations present in terms of intellectual capacity and cultural tools?
    - How do you produce learning in these populations?

- What factors favour their learning?
- What obstacles impede the development of these capacities (in the family, school, community, political context, or economy)?
- How can we overcome these obstacles?
- What uses of digital technologies are those that contribute most to the development of capacities?
- What are the emotional, psychological, and cultural impacts of the digital technologies on student coming from disadvantages communities?

- **Research on the ways to make a lasting contribution on poor populations in the education system.** The question of access to education for poor populations has been tackled much more frequently than the question of how to keep poor populations in the system despite the fact that the structural conditions do not change as students advance in their school career. Given this, it is worth researching what are the other reasons, in addition to poverty, that are causing students to drop out of school.[21] What is the relationship between the characteristics of education and the possibility that poor students build an idea of getting through or an expectation of the future? How does the work of the mothers and fathers contribute to the construction of a sense of importance for education as a social stimulator? What is the effectiveness and the results obtained through the use of aid policies such as scholarships, prizes, money for families, and incentives for educational centres to help poor students stay in school?

- **Research on the most satisfactory and effective environments, strategies and pedagogical mediation for the development of capacities in poor and vulnerable environments.** What are the characteristics of the educational processes with the best results in the development of capacities in people in poor and vulnerable communities? In what ways can digital technologies specifically contribute to these processes that stand out for their effectiveness? How can the digital technologies be employed to attract and retain youths in situations of risk or who have abandoned the education system? What training is required for the educators or facilitators in order to develop these types of processes with poor and vulnerable populations? What deficits are there in the supply of training for educators, if the aim is to develop the necessary competencies?

2. Policies and practices in the use of the technologies in education

- **Creation, systematization and constant updating of the existing knowledge base on different programs and initiatives in the region.** There have hardly been any serious or broad systematization efforts made and this means having to go back to the information provided by the very

[21] For example, according to data from the State of the Nation program in Costa Rica, poor students are dropping out of school and not only because they cannot stay in school, but rather because the education system does not interest them, nor does it generate income possibilities for them in the medium-term.

organizations responsible for the projects, which is often incomplete and very general. Another difficulty is that the discourse and theoretic justifications presented by the organizations do not always coincide with practice and the real reach of the initiatives. It is important to increase the existing knowledge in the region in this respect through the creation of databases, the production of reports and analytical recapitulating inventories, and the clarification of the map of approaches that are developing in the region according to the specific initiatives.

- **Research on the rear-view mirror syndrome in use policies for digital technology in education.** How has the tendency to introduce technological innovations to adjust traditions and previous routines been reflected in the policies implemented in the region? What uses of technologies have been favoured for this tendency? What examples of good practices can be found where they have reversed this tendency? What uses of the technologies are those that have promoted these other initiatives?

- **Research on the impact of different modalities of the use of digital technology in education.** Studies that contribute to specifying the impact of different initiatives in the region, in a way that they can make conclusions on the effectiveness of different modalities (technological literacy, learning environments, projects based on the use of the Internet, etc.) will be especially relevant. In this aspect, the possibility to count on comparative international indicators would be especially valuable. It would also be very valuable to be able to delimit the impact of these initiatives in terms of equity, and in relation to their results on poor and vulnerable populations. Different models of impact studies could be developed: correlation studies, cuasi-experiments, case studies, etc. (Kozma, 2003).

- **Research on performance indicators (Infodev, 2005)**. It is important to further advance in the development of performance indicators in order to monitor the use and impact of digital technologies in education, especially with respect to the impact in poor and vulnerable populations, just as in the generation of indicators that can be valid in countries in the region.

- **Effectiveness and appropriateness of educative portals.** The creation of educational portals is a trend that is currently gaining a lot of force. Government initiatives, ministries of education and even corporations have made important investments in this area. The idea of educational portals basically has to do with three elements. First, the possibility to distribute information in a fast and precise manner; second to secure the interconnection of information linked with a task or area of interest; and third, to favour spaces for the interaction of pairs (educators, students). Even though these three aspects appear to be adequate to support educational management and experiences, the levels of interactivity that they offer are still insufficient for generating a fluid interaction that goes beyond the mere distribution of information. Some of the themes of interest related to research on educational portals are: What are the levels of automation that

education services need so that the portals function as educational management spaces? In what measure have existing and well-known educational portals brought a change to the production publication culture of educators? What are the lessons learned and the possible recommendations in this field?

- **Language, indigenous people and culture.** How can policies for the universalization of access to technology take the social and cultural particularities of indigenous groups into account? How can the cultural transition experienced by these groups when they face these challenges be made more smooth and appropriate? What is the impact of the technological modernization on the development and preservation of indigenous cultures? What is the contribution of the technologies to the conservation and diffusion of the indigenous cultural patrimony within the same communities in the country? How can the linguistic diversity of the Latin American countries be protected and promoted in the face of English as one of the languages fundamentally required in the context of the knowledge economy?

3. Education as trans-sectoral policy

- **Articulation of educational policies with other sectoral policies with a view to promote the knowledge society.** It will also be convenient to propel forward evaluations of the processes of development which identify examples good practices in the region of how educational policy has coordinated in a successful way with other sectoral policies (economic, social, science and technology, telecommunications, health, cultural, urban planning, etc.) to achieve the goals related to advancing towards a knowledge society. Equally, it could be very valuable to, through prospective analysis, identify the viable ways to articulate between initiatives that already exist in different sectors as much in the macro plan as in the micro: how to connect educational initiatives with experiences that already exist in other sectors.

- **Analysis of national development strategies, and not only punctual programs or initiatives.** This will permit the global intervention approaches to be studied, and will allow for the detection of strong and weak points at the macro level. In some cases, it could be that the conception errors lie in the absence of a certain type of initiatives or in how these are articulated in framework of a general strategy, and not in the approaches adopted by an initiative in particular. Due to the scarce experience in the region in this field, it would be interesting if the analysis permitted strategies to be visualized and orientations to be expressed which would guide them using the lessons learned in other places and in a very special way, according to the studies on the specific potentialities of each country.

- **Articulation of policies, strategies and programs between education and other areas of emergent technologies.** Education represents a transversal aspect for thinking of human development. Nowadays educational proposals are needed that articulate with others that drive the use of digital technologies in

general and the Internet in particular, in order to open social spaces and generate a true cultural change. In this way, it becomes appropriate to better study and understand the ways in which cultural change can be favoured by the use of networks in order to generate spaces of true e-citizenship, support networks for community health so necessary in areas and places where access to public healthcare services is restricted by resources and complete medical assistance (eHealth), just to mention some of the areas where Internet technologies appear to make a difference in the type of opportunities that people and communities can be offered.

Finally, we conclude that there is a need to put existing knowledge and that which is generated, into the hands of the politicians and decision-makers. It is important to invent ways for the information to escape from the field of academics, experts and executing organizations, and reach those that are making decisions on large investments in educational and technological material (national politicians, leaders of cooperation agencies, financial organizations, etc.).

6. Bibliographic and documental references

Aviram, R. and Tami, D. (2005): *The impact of ICT on education: the three opposed paradigms, and the lacking discourse.* Consulted online at: www.elearningeuropa.info/extras/pdf/ict_impact.pdf (03/11/2005).

Busso, G. (2001): *Social Vulnerability: Notions and IMPLICANCIAS of policies for Latin America at the Stara of the 21st Century.* Document presented at the International Seminar: The different expressions of social vulnerability in Latin America and the Caribbean. United Nations. CEPAL. Santiago de Chile.

Carr, N. (2003): *It doesn´t matter.* Cambridge: Harvard Business Review.

Castells, M. (1999): *The Information Era. Economy, Society and Culture. The Network Society.* (Vol1). Editorial S. XXI: México.

Castells, M. (1999): Opening lectura given in the Knowledge Society Doctoral Program at the Open University of Cataluña.

Menujin, A. (s.f.): Vulnerability and exclusión in Latin America. UNESCO (mimeographed version).

Feres, J.C. and Mancero, X. (2001): *Poverty measurement approaches. Brief literature review.* Statistic and prospective research series. Division of Statistics and Economic Projections. Economic Commission for Latin America and the Caribbean CEPAL. Santiago de Chile.

Finquelievich, S. (coord.) (2003): *ICT and the reduction of poverty in Latin America and the Caribbean*. Research undertaken in the Information Society Research Program at the Gino Germani Insitute at the Faculty of Social Sciences at the University of Buenos Aires. Consulted online at: http://reseau.crdi.ca/uploads/user/11013834211TIC_y_reduccion_pobreza_de_la_pobreza_en_ALC.doc (03/11/2005).

Fonseca, C. (s.f.): *The great education challenges in the period of globalization.* Paper presented at the Global Progress Seminars organized by the International Socialist. Consulted online at: http://www.globalprogress.org/castella/seminarios/cfonseca.html (11/11/2005).

Fonseca, C. (2005): "*From ICT to Digital Creation and Productivity: Releasing the Potential of Technology for Education and Capacity Building,*" in Access, Empowerment and Governance: Creating a World of Equal Opportunities with ICT, edited by Rinalia Abdul Rahim, Daniele Waldburger, Gabriele Siegenthaler Muinde. Kuala Lumpur: Global Knowledge Partnership, p. 121-143.

Fundación Chasquinet (2002): *State of telecentres in Latin America and the Caribbean.* Consulted online at: http://reseau.crdi.ca/uploads/user-S/11009813281telecentros-estarte.doc (29/10/2005).

Fundación Omar Dengo (2005): *Education and digital Technologies. How to value their social impact and contributions to equito.* Research Department. San José, Costa Rica (mimeographed version).

Garrido, R. and Morales, M. (2003): Digital technology is not magic: the Community Information Network and its contribution to overcoming poverty in La Araucanía. *X Annual Conference of the Latin American and Caribbean Social Network.* Santiago, Chile. Consulted online at: http://www.iie.ufro.cl/documentos/Ponencia_CEPAL.pdf (29/01/2005).

Garrido, R.; Hepp, P.; Ripio, M.; Morales, M.; and Villarroel, A. (s.f.): *School, a space for the opening up of community telecentres: experiences with parents and representatives in Chilean educational establishments.* Consulted online at: http://globalcn.tc.ca/gcn2001/Garrido.doc (03/11/2005).

Hepp, Pedro, Enrique Hinostroza, Ernesto Laval and Lucio Rehbein (2004) Technology in Schools: Education, ICT and the Knowledge Society. Study prepared with the support of the World Bank.

Infodev (2005): *Knowledge Maps: ICTs in Education. What do we know about the effective uses of information and communication technologies in education in developing countries?* The International Bank for Reconstruction and Development / The World Bank. Consulted online at: http://www.infodev.org/files/2907_file_Knowledge_Maps_ICTs_Education_infoDev.pdf (7/11/2005).

Kozma, R. (ed.) (2003): *Technology, innovation, and educational change: A global perspective*. Eugene: International Society for Educational Technology.

Kozma, R.B. (2005): National policies that connect ICT-based education reform to economic and social development. *Human Technology*, 1(2), October, 117-156.

Levinson, P. (2001): *Digital McLuhan: A guide to the information millennium*. London: Routledge,

Londoño, L. (2000): *Ideas for a UNDP work strategy in social sectors.* Consulting report for the UNDP.

PNUD (1996): World Development Report 1996. Madrid: Mundi Prensa.

Open Network Links to the COmmunity (2002): Proposal of models of sustainability for infocentre implemented in educational establishments belonging to the Links Network. Social and economic dimensions. Educational Links Network, Chile Ministry of Education. Consulted online at: http://www.infocentros.gob.cl/Descargables/Sustentabilidad_Enlaces%20y%20Comunidad.pdf (02/11/2005).

Reich, R. (1992): *The Work of the Nations*. New York: Vintaje Books.

Villatoro, P. and Silva, A. (2005): Strategies, programs adn experiences to overcome the digital divide and the universalization of access to new digital information and communication Technologies. Social Policy Series, 101. Santiago de Chile: CEPAL, Social Development Division.

References consulted online

United Nations Development Program (UNDP) (http://www.undp.org/spanish/ (11/11/2005).

Shore to Shore Project (Proyecto de Orilla a Orilla)-I*EARN Internacional Network for Educational Resources(Red Internacional de Recursos para la Educación). Puerto Rico. URL: http://www.orillas.org (11/11/2005).

Telcor Telecentres Project in Nicaragua.

URL: http://www.telcor.gob.ni/Deplegar.asp?HTML_ID=11 (02/11/2005).

School Network, México. URL:http://redescolar.ilce.edu.mx (11/11/2005).

Nacional Network of Community Telecentres in Chile, URL: http://www.telecentros.udec.cl/proyecto.htm (02/11/2005).

Community Telecentres in the City of Morelos, Mexico. URL: http://telecentros.org.mx/antecendentes.html (02/11/2005).

Opening lectura of Manuel Castells at the Iformation and Knowledge Society Doctoral Program, Open University of Cataluña.

URL: http://www.uoc.es/web/esp/articles/castells/print.html (03/11/2005).